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Children's Conceptions about Information Literacy

Doctoral (Ph.D.) Thesis

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Contents

1. Information Literacy

The concept of Information Literacy has been defined by many and in many different ways. Since it is a complex concept the lists of characteristics and skills are definitely not sufficient. As we see it, Information Literacy is not an aim to achieve, it is rather a field where of course development plans are to be identified but these do not provide the definition of the concept. Since the essence of this concept is the information and content centered approach it is not worthwile to connect it with specific tools or activities. It is better to define the goals and activities in general terms, however, generalizing alienated from the content should be avoided.

To sum it up, Information Literacy is the part of our knowledge which helps us find our way in the midst of information from all walks of life and make use of it. To be more specific: the part that helps us see and appraise what information is necessary, and find the necessary sources of information we obtain, process, use and share the information while this part of our knowledge also helps us comment on the whole process.

High level information literacy as the goal of development includes the need for knowledge as well as comprehensive, critical approach and moral responsibility. People with high level information literacy understand the operation of information processes and adopt efficient and flexible procedures.

The information environment along with information literacy have a higher value in contemporary pedagogy when, among others, constructivist pedagogy, information problem solving and lifelong learning come to prominence. In the information society self-reliant and self-regulated learning as well as the most conscious structuring possible of their own knowledge are expected from citizens. Schools are required to give careful consideration to how students process the information and how they improve their learning. (Klatter - Lodewijsk - Aarnoutse, 2001)

The constructivist approach of learning in many respects / essentially is in harmony with the interpretation of information search and information problem solving in a wider process. (Koltay, 2007b) This parallel emphasizes the prominent role of information and through this also of library environment in the learning environment. Beside the physical environment it is also constituted by the attitudinal environment where the importance of self-reliant information problem solving, activity and a critical eye are accented during the whole learning process. That is, during the learning process not only the information is needed: the active work carried out on the information is deeply affected by the quality of information literacy and thus it defines the quality of knowledge construction.

2. The Role of Beliefs in the Learning and Teaching Process

According to the constructivist approach our knowledge is the result of our own construction and to what extent, in what role and context it becomes part of the students' knowledge depends on their preconceptions and knowledge about the subject as well as the construction and content of the structure where the student wants to fit the new elements. He or she will fit in the ones that fit there and distort and reinterpret the ones that do not fit to make them acceptable or completely excludes them. After the earlier pedagogical paradigms having the thinking structures and sets of views in the limelight of pedagogy is a real novelty. (Csapó, 2002; Nahalka, 2002; Bruner, 2004; Kiss, 2009)

We claim that the view scheme is a peculiar, relatively stable scheme of the knowledge system that defines thinking in its content and structure not primarily as conscious and that we consider in its entirety a world concept. (Nahalka, 2002; Falus, 2006; Szivák, 2003)

Our knowledge about the content and structure of prior knowledge assumes particular importance in terms of the understanding of the learning process. Therefore the subject of our research is the understanding of views and their changes.

2.1. Beliefs about Information Literacy

A comprehensive study of Hungarian and Anglo-Saxon scientific literature reveals that models and interpretation frameworks are present as far as the research of the views on information literacy are concerned while studies and the theoretical approach aiming to create interpretation frameworks of libraries and the Internet are rather rare or entirely absent.

Analyzing and systematizing these results and models made it possible to create frameworks which were useful especially in the third phase of the research. Their interpretative views, thinking categories and questions were a great support during the creation of the attitude scale questionnaire and the interpretation of its data. The theories and frameworks that proved to be useful during the research will be described along with our results.

3. Objectives of the Study and Questions Addressed

The ultimate objective of this study is to call attention to the role and potentials of the libraries and sources of information in learning and support their efficient use.

The method and approach of Resource Based Learning formed in the mentality of reform pedagogy has not spread in Hungary despite its presence both in Hungarian theoretic writings and research. (Nagy A., 1978; Celler, 1983; Barták, 1992). Another, less commonly used notion in Hungary is the learning resource center, where the library is an integral part of the teaching and educating activity in a school as well as a place where teaching and studying take place; rather than just a collection of resources it also helps learning and is a place where students can learn and use the information.

There are two main reasons for the fact that library pedagogy has not become an integral part of the methodology of pedagogy and subject pedagogy. On the one hand contemporary theoretic writings do not mention the theoretic and practical studies in the field of constructivist library pedagogy, and this presumably affects education as well. Another reason may be the lack of a receptive audience. One of the principal objectives of this study is to discover the various methods, tools and analytical frameworks to explore and interpret the concerning views. Since the use of ICT tools has become perceivably widespread and preferred nowadays we have studied the views in a wider and more complex context and from the perspective of information literacy.

Pedagogical research mainly studies learning environment problems from the teachers' perspective. We concentrate on the views of students and see them as a component of the learning environment as a system.

We wish to provoke professional discussion with our findings and research framework among teachers, librarians and school library teachers.

3.1. Specific Questions

To accomplish the above mentioned broader objectives we previously posed the following specific questions:

1. What is the role and importance of the sources of information, information institutions, information literacy and information itself in children's science (children's notions of the world)?
1.a How much are children concerned with the topics of information, information seeking, books, libraries, computers, internet…?
1.b How important, indispensable, useful do children think these things are?
1.c What is the relationship between their approach of the various elements and institutions of information literacy?
1.d How are the single elements of information literacy connected with learning?

2. Which are the actual conceptions of children regarding the contents of information literacy?
2.a What do children think of information, its characteristics, aims and benefits?
2.b What do they think of information seeking and the use of information?
2.c about libraries?
2.d about the Internet?

7. Which research methods, questions, interpretation frameworks are the most appropriate to explore the notions regarding information literacy?

4. Research Methods

4.1. Research Process

Figure 1 shows the research process. It illustrates how after each development phase research „restarted" adopting a partly new approach. This was a typical case of progressive focusing (see Hammersley & Atkinson) where the goal of the research is set during the research process (quoted by: Szokolszky, 2004, 402.).

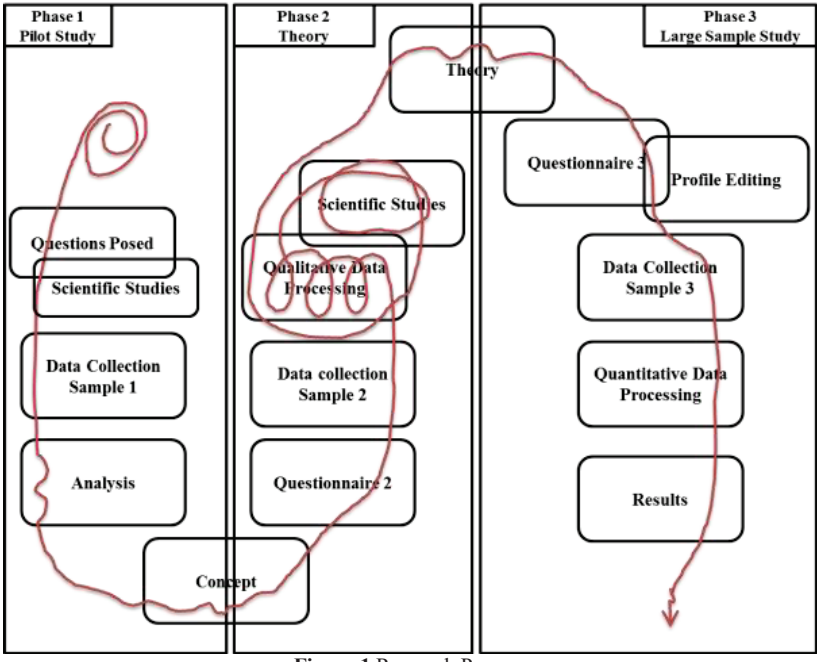

Figure 1 Research Process

4.2. Research Samples

The data collection of the 2nd – quantitative and qualitative – phase of the study took place in a Budapest school (8th District, students aged 13-14, n=21) in 2006 using the convenience sampling method. The questionnaires containing 105 open and closed questions were completed in 13 sessions.

Although the 3rd phase was conducted in a larger sample, the sample used in this phase cannot be considered representative for a number of important reasons. At this stage the aim was to test the theories that had been previously developed and find the differences between the different groups. Accordingly, we adopted the stratified convenience sampling strategy. This had a few stages taking place between February 2010 and August 2011. The sample of 647 people included 4 main subsamples: students 49,3%, university students 30%, library teachers 10% and other librarians 7,6%.

4.3. Data Collection Methods

Analyzing the data collected in the 1st phase, the similarity between certain patterns of the answers and the fact that the questions were asked in general terms gave the idea of dividing the next questionnaire in several subsections and asking the same questions within these subsections referring to the subtopics. The first one includes the underlying factors, the second collects the general open questions referring to what the students find interesting, followed by the questions which were identical and referred to the 3 subtopics.

The data collected during Phase 2 did not provide sufficient textual proof for the hypothesis put forward at the end of the phase. However, the hypotheses and conceptual framework descriptions provided by the data and theoretical analysis of the 2nd phase serve as a sound basis for the creation of an attitude scale questionnaire (Bipolar Likert scale). The online questionnaire of the 3rd phase has 4 blocks. In the first one the questions referred to a few background variables. The following ones contain statements of the 3 subtopics and had to be answered on a 5 point scale on degree of agreement.

4.4. Data Processing Methods Applied

Both the data processing theory and the applied methods went through continuous development and changes in the different phases of the study. Similarly to the grounded theory it was the steady interaction of category development and data analysis that stimulated the research process and this helped to find the focus of the study and provided clear objectives. (Szokolszky, 2004) The process was different from the one described by Glaser and Strauss: instead of a spiral it followed a rather winding path (Figure **Hiba! A hivatkozási forrás nem található.**), since the focus did not simply emerge but significantly changed and shifted.

Evolving the code system was the most time-consuming task of Phase 2 but maybe of the whole research process. Axial coding and the analysis and sorting the categories required the work to follow a concentric pattern in order to see a suitable approach emerge. The code system had to be modified several times because we were aware of the fact that the quality of the category system and the coding defines the quality of the text analysis and the essence of the research. Data processing took place in 2 stages in Phase 2 using CAQDAS programs (Computer assisted qualitative data analysis software) which offered both qualitative and quantitative support.

This software offers far more than just data recording and word processing by supporting several phases of the processing. Although these programs can not solve the problems of formulating a theory, they are able to support this process. They do not offer a processing method but provide alternatives. We claim that no ideal software and no ideal using method exists. The researcher's creativity, control and personality must not be neglected during the research and analytic processes. (Lewins - Silver, 2007) The person who carries out the analysis and the research has an important role in the analysis. Thus, the subject of the research and the researcher process the data together.

In the 2nd phase of the research process we used 2 types of text analysis software: Atlas.ti v5.5.9 (Archiv für Technik, Lebenswelt und Alltagsprache) developed by the German Scientific Software Development and QDA Miner v3.2.2 (Qualitative Data Analysis) of Canadian Provalis Research Corp.

Processing the data of the online questionnaire we first used the SPSS 17.0 statistical analysis software to examine how much the various predefined mindsets are present in the sample and the different subsamples. Although "by unwritten rules if the scale has at least 5 points it is possible to regard the values of a variable as interval data" (Falus - Ollé, 2008,

80.), during the first analyses we adhered to statistical calculation conform to the ordinal data. However, later on we made sure that the results of CATPCA (Categorical Principal Components Analysis) and the factor analysis are not very different so we exploited also the rotating potentials of the latter.

5. Results of the Study

5.1. The Importance of Information Literacy in Thinking

5.1.1. The Role and Importance of Presence

As for questions 1.a-b we saw that the students questioned in Phase 2 were not particularly interested in information literacy and the world of information. This result was foreseeable and presumably is quite typical of their generation. The only related subject that some of them was interested in was information technology.

Our original hypothesis was only partially confirmed: the answers provided to the general questions did not contain books or libraries. More surprising and contradicting our expectations was the absence of the media. Electronic sources and computers were mentioned although not to a great extent.

The students consider the internet a much more useful and necessary tool than libraries. This opinion was influenced by their attitude: 7-8 of them think that libraries are completely useless and unnecessary. Their reason for this was that they think libraries can be well substituted by computers. Those who think libraries are important referred to several functions. These were both traditional library services (reading, borrowing) and the main functions (information service, knowledge base).

As for students' opinion regarding computers and the Internet the results of both Phase 2 and Phase 3 imply that they think technology is important. Regarding indispensability neither students nor librarians had a homogenous view. The differences between students and librarians must be stressed in order to promote information literacy and library use.

5.1.2. Relations of Information Literacy in Students' Beliefs

Members of the class questioned have different views of information carriers. They have complex and greatly varying views in this respect. The importance of electronic information carriers in students' views of information was below expectations. However, in the views of some groups of the students certain carriers are more present.

The students questioned see the main similarity between the library and the Internet in the information function, and this demonstrates that our hypothesis that they would not see the functional similarities was too pessimistic. The result indicates that the students have the necessary knowledge to understand the common functions. Their approaches to the differences varied and the focus here was not on function.

They have no negative attitude towards the Internet whereas their opinions of libraries were of 3 different types: positive, negative and complex.

Remarkably, the use of information was seldom among the activities they mentioned referring to information. From the user's aspect they mentioned mainly passive activities referred to libraries and active ones referring to the Internet.

5.1.3. Students' Views of Learning

Information and information seeking are usually linked in people's minds to learning and knowledge. The students questioned however, had rather diverse views in this respect. A significant number of them did not see a connection between these things.

The students questioned in Phase 2 connected learning more often to libraries than to the Internet, they wrote more and in a more complex way about libraries whereas their views of the Internet were much more positive: they think that the Internet is more important in learning, work and everyday life than the information they can collect in libraries. They think

libraries are more traditional than the Internet but traditional elements are rather accented also in their opinion of the Internet.

Our hypothesis regarding the connection with learning has only partly been confirmed. We could clearly distinguish a group which identifies principally books/erudite books with learning. Their approach in these cases was rather negative. We did not see though that they would connect learning with the Internet (as a strategy to avoid failure or to enhance efficiency).

This brings to the conclusion that in this class the views of the children have not followed the theoretical/professional changes of learning and learning environment where the sources of learning and knowledge can be diverse. However, the students have very diverse approaches.

This raises the question how much students are able in the specific teaching- and teacher-centered learning environment to regard the sources of information and the information tools as an environment that enhances learning and efficiency. Exploring further and understanding the views of students in this respect can help teachers, library teachers and IT teachers to support students in learning effectively in a resource based learning environment.

5.2. Specific Beliefs from the Areas of Information Literacy

5.2.1. About Information

4 main units of content were formed, including the notion of information. Regarding information no preliminary model, conceptual categories or possible opinions were created.

The qualitative analysis demonstrated that the notion of information as such is difficult to apprehend and our assumption proved to be valid: students' approach was either neutral or positive in this respect. They consider it necessary. Contrary to our preliminary hypothesis their view of information is quite passive: they tend to just receive it rather than look for it. They think of one-way communication in this context. Their view of information needs to be developed and the notion must be reinforced.

Studying the answers 3 different view schemes emerge. In 2 of them the outward forms and carriers of information have a prominent role. The 3rd category does not think of the carriers of information, it stresses one of its functions, seeing it as a source of cognition.

The questionnaire of Phase 3 indicates that the students think of information as more objective both from the provider’s and the receiver’s point of view. Although the level of acceptance is not particularly high and students' opinions were diverse this aspect should be explored in order to improve critical thinking and prepare students for careful information processing.

5.2.2. About Information Search

We were able to use as a point of reference several approaches of this subject offered by theoretical studies (Figure 2).

Bruce, 1999	Maybee, 2006	Limberg, 1999	Summarized
1. Information Technology	*Use of Information* = using resources to find information	A) Data Seeker	**I.)** Wants **mechanical** solution for the task / (simple) answer
2. Source of Information			
3. Information Process	= initiating a process	B) Ponderer	**II.) Optimalist,** Wants objective, right answer
4. Information Control			
5. Knowledge Construction	= broadening one's knowledge to achieve aim	C) Analyzer	**III.) Analyzer,** Wants to understand and improve
6. Knowledge Expansion			
7. Wisdom			

Figure 2 Summary of view schemes about information literacy

The view schemes in the last column of Figure 2 provided a base for the statements of the attitude scale questionnaire. The factor analysis of the results required minor modifications of the categories. During the analyses the following conceptual frameworks were examined:

I.) Minimalist

Concentrates on the task rather than the problem and thinking. Searching information is just a part of the task and in the thinking process it is not linked together with the original problem and the purpose in an organic whole. Regarding the problem solving that requires the information this approach is concerned with the quantity of data. Minimalists presumably want to find the first hand, written answer to their questions. They want an answer which is *the simplest possible and not the information which is necessary for the answer.*

II.) Systematic Perfectionist

Has a wider horizon. A horizon that may be too wide. Thinks that the solution of the problem is at the end of an optimally conducted process. Believes that all information directly related to the subject should be examined during this process. After the systematization, analyses and reflection a perfect, objective and optimal answer can be found. Thinks that understanding is an important factor of the process as it is indispensable for the systematization and analysis. *Tries to systematically find the entirety of information to find the most perfect and optimal answer possible.*

III.) Analyzer

The focus of information problem solving is the complex understanding of the problem as well as (self)improvement. Besides accomplishing the task the purpose is also learning, improving and even bringing benefit for others and developing society. Rather than to the quantity or quality of information this approach concentrates more on the particular approach of the provider and its novelty. *Wants to know, to understand the subject in order to have a personal viewpoint and find the answer.*

Regarding thinking categories the sample of Phase 3 belongs mainly to the Analyzer type. In contrast to our hypothesis this is typical for the students but as a student goes to higher education or a person becomes a librarian they tend to be rather Analyzers than Minimalists.

Students' views were diverse as for the examined frameworks both in the groups and between them. A considerable proportion of the students belong to the Minimalist or the Maximalist types. This diversity of students' notions requires special attention during the planning of resource based learning.

Both groups of librarians belonged mainly to the Analyzer type. This was clearer in the case of the other librarians. Library teachers tend to be more receptive to certain elements of the other two frameworks.

5.2.3. About Libraries

Question 2.c refers to the focus of our research. Based upon theoretic studies and our own theory we applied two rather different approaches to the notion of library.

Phylogenetic Model

Examining the development phases of he relating sciences is a possible way to formulate theories. (Figure 3). Researchers of the views in natural sciences indicate that people often have ideas and conceptual frameworks that have already existed in earlier periods in the history of science. (Nahalka, 2002, 92.)

Main Categories	Attributes	In Short
Traditional Paper-based	H1. collection of ***erudite*** books for he privileged, for scientists	Medieval
	H2. collection of books for everyone who likes ***to read***, place to borrow books	Bookworm
Modern Document-based	M1. collection of all types of ***documents*** (not only books)	Document Collection
	M2. documents and related ***services***, not only for borrowing	Service Center
Postmodern Information-based	P1. ***information center***, it is not about documents but about information and providing information	Information Center
	P2. information center, the service is not connected to a building, ***online*** services, one does not need to walk into a building to become a library user	Online Library
	P3. user = mediator; Library 2.0	K2.0

Figure 3 Possible Library Types with the Types of Library Development Paradigms (Dömsödy, 2008, 66.; 2011, 50.)

The concept and meaning of library or library science continuously broadens. Initially it mainly dealt with documents, later more related services were added, primarily to serve sciences, then, responding to scientists' need for information they concentrated on the information found in the documents rather than the documents themselves. Thus instead of managing documents libraries manage knowledge nowadays. (Horváth, 1999) The Figure demonstrates the traditional, modern and postmodern categories referring to these phases.

H – Paper-based
People whose ideas refer mainly to printed books fall into the *traditional* category. The two groups within this are (H1) the library of "medieval" sciences and scientists and (H2) the library referring to reading, bookworms, and borrowing books.

M – Document-based
Thanks to the more general use of new document types (more) *modern* libraries and library images contain more diverse information sources, document types and documents to read in a variety of forms, contents and for new target audiences (M1). Together with this development services are offered in a much wider range as above mentioned (M2).

P – Information-based
The library images here referred to as *postmodern* emphasize not the carrier but information itself. This development of sciences and services was supported by the continuously developing technologies and informatics. It is easy now to separate information from its original carrier and library services from the library building (P2). The next scientific development phase (P3) is a result of both technical and conceptual changes and the boundaries between librarian and library user become indistinct. In paradigm K2.0 the reader/user is interactively involved in the work of the library (e.g. suggesting books, building stock).

Our hypothesis that people's thinking has not caught up with or has not followed the development of libraries – or in other words that libraries have not been able to make their development accepted by their wider target audience – was confirmed since Phase 2, namely the document-based concept was the most widespread among the library images.

We also assumed that the paper-based framework would be the most widespread. The results of questionnaires have not supported this hypothesis. The paper-based library image is infrequent both in the whole sample and the single professional groups. However, "average students" do not refuse the relevant statements, and a small group of them (8.5%) have primarily this notion of libraries.

As we can see mainly younger students (23.5% of 14-15 year olds) tend to have the paper-based library concept.

Library Role Concepts

Looking back at the history of Hungarian public libraries Katsányi (1991) claims that professionals have three distinct characteristic role concepts. These library images may be principally the images of librarians and cultural policy that has been created so far or the organizing powers of general library images.

Educator
Or humanist. This library embraces essentially conservative views, is benevolent and a committed supporter of the library as a guardian of aesthetic values which has the "secret" role of educator besides guarding values.

Liberal
Sees the library mainly as a service provider where democratic values, the concept of free information transmission and the possibility of free choice are dominant.

Social
The library has an educational function with special attention to the disadvantaged. Besides the social commitment it expresses interest in community development.

The questionnaires confirmed our hypothesis regarding the notions of the function/role of libraries. The groups questioned tend to support the Liberal library image, although this is more typical among the librarians rather than among the students. Also the image of the library as Educator is rather widespread among librarians. In contrast to our original hypothesis the two concepts are in positive rank correlation which indicates that librarians believe in the value transfer that adapts to users' needs.

Quite surprisingly librarians reject the Social image of libraries. They do not see the library as a community space and do not think that its role might involve human, emotional support, helping the disadvantaged, or offering free membership.

In the process of library user training and service development the differences between librarians and users should also be emphasized. Students (users) see the library as document provider rather than an information institution. This could hinder the propagation of library initiatives aiming at providing more information-centered services and of resource based learning among teachers. On the other hand librarians do not see the library as a primarily information centered institution – this could be the reason why they are not able to develop readers' mindset in this direction.

5.2.4. About the Internet

Regarding the Internet we adopted two rather different approaches based on theoretic studies and our own concept.

Phylogenetic Image of the Internet
We believe that similarly to the method applied for library image modeling the development of Internet use can be described with the categories illustrated in Figure 4. It must be emphasized again that this picture does not necessarily describe the habits of the individual. The outlined picture shows people's notions of the essence and the purpose of the Internet.

Main Categories	Features
Traditional Information Seeker	Passive recipient: Internet is a ***source of information*** (browsing webpages) + e-mail
Modern Knowledge Sharing	Static creator: user takes active part in building, Internet is also ***information transmitter***, communication model (home page creation, editing, forums, chat, games, file sharing etc.)
Postmodern Self-representation	Continuously present: Internet is always present, one can always modify it, it is a lifestyle, ***self-representation***, self-expression (blog, wiki, social networking websites, photo sharing)

Figure 4 Possible views of the Internet with its functional evolution

H – Information Seeker
The traditional concept of passive reception which regards the Internet primarily as an unlimited source of information.

M – Knowledge Sharing
A relatively modern interpretation focusing on users' activity as one of the main characteristics of the Internet. Information is not just there on the Internet: it is accessible

thanks to the users. The Internet is more than a source here: it is a transmitting interface that anyone can statically modify.

P – Self-improvement

The postmodern interpretation concentrates on a lifestyle rather than the information. The internet is an organic part of our life and we are an organic part of the Internet in this lifestyle. It is a tool for self-improvement and self-expression.

The complete examination of the phylogenetic image of the internet took place only in Phase 2 of the study. Interpreting the questionnaires demonstrated that we could not assign statements to the information seeking approach.

Our sample and subsamples represented mainly the knowledge sharing approach. In contrast to our original hypothesis students do not tend to see the Internet as a tool for self-representation although most of them agree with this concept.

Beliefs of the Internet Regarding the Future

Based on the findings of Contarello and Sarrica (2007) we saw three distinct view schemes. However, the data analysis resulted in some changes regarding the internet.

We did not change the *Risk Factor* category which believes both the present and the future are threatened because of the problems. The elements of the original Magic Spell category were split in two parts during the main component analyses, reviving the interpretation framework. In the original theory democratic values and quality were attributed together to the Internet. Now we think that these values should be considered separately. This led to the *Magic Spell of Democracy* view scheme which represents the Internet as the key to establishing and assuring democracy. The *Leap Forward* conceptual framework claims that the Internet is necessary for quality and success.

This aspect helped us draw a more accurate picture. Every examined group can see the potential risks but most of them think that the Internet in some way will make their life better. The emphasis was however placed on different aspects for students and librarians. Librarians highlight the social aspects, while students emphasize the personal and more general aspects.

Although a significant number of people concentrate on the risks of the Internet, this is not relevant in students' views.

5.3. Information Literacy Images from the aspect of the Three Subtopics

Along with the view schemes described in the subtopics three distinct general information literacy view schemes can be mentioned.

Some people have very traditional views of information literacy, we might say they *simplify* the concept. They can not see the content of information. They are so involved in accomplishing the task, in the tools and methods that they can not see the subject, the essence of information. Also their views of libraries and the Internet are simplified. When they think of libraries they see the act of reading and when they think of the Internet the see the threats.

Another group attaches such great importance to the *positive features of the Internet* that the features of other areas are given no space at all in their thoughts.

The third group is similar to the one described as ideal attitude in the definition of information literacy. It is the *information* and its content that inspires them. They are *open-minded*, versatile, are ready to share their knowledge and use it to help others. In their image of libraries the documents of the library have a prominent role, but they see the importance of other information services as well.

6. Conclusions, Practical Applications

The research of thinking has been absent so far from Hungarian research studies aiming at the development of library use training. Consequently, it is difficult to locate and compare our results in relation to other ideas. At the same time new opportunities arise to pose several further questions and explore new areas of research.
Our methods and results show new aspects for the theoretic library-pedagogy professionals in order to explore the reasons of the absence of resource based learning and place this not at all recent method and approach in constructivist interpretation in a more organic and more specific way. The possible descriptions of view schemes about information literacy and some of its subtopics may be particularly important. They can serve as a base for the interpretation of certain problems and the understanding of conceptual background.

The results can serve as an interpretation framework if library teachers want to interpret and evaluate the behavior and results of their students. The conceptual frameworks and the methods as a whole or in parts can help to explore students' notions and support the self-reflection of library teachers.

The results and focused problems can be particularly interesting for librarian (library teacher) education. Although we are in favor of cognitive diversity we believe that some view schemes can hinder high quality and efficient work. We think that regarding information search the Analyzer view scheme is the most efficient and also the Maximalist can be effective whereas the Minimalist approach can not result in efficient work. We also believe that the phylogenetic method applied when describing the reflection on libraries shows the direction for development. It may pose a major problem if the library teacher does not have the highest view schemes in these areas. These conceptual view schemes create a problem for the teachers from two aspects. On the one hand they have to find out how it is possible to improve the attitude of future teachers or of the teachers participating in a postgraduate training concerning their own work and goals. On the other hand the question is which methods and tools can be offered for them to improve themselves and their students. Developing the teaching material and trainings for this work can be an important following step.

Apart from the use of information and libraries the definition of these views, the interpretation of information from different sources and their integration in our knowledge is particularly important both for the teachers and the science of pedagogy. Our results can serve as a base to raise consciousness of learning with resource based tasks in order to improve self-regulated and lifelong learning. Significant differences can be seen regarding how much libraries or the Internet can support learning along with differences in the attitudes.

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